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United States Department of Agriculture
Bureau of Entomology and Plant Quarantine

A MOBILE SAMPLE-CARRYING RACK

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For a number of years fruit samples from apple orchards have been collected throughout the growing season and brought to the chemical laboratory (for residue-deposit analysis) in inexpensive paper bags. This practice has resulted in the physical removal of some of the residues, owing to contact with the bag surface during travel and subsequent handling preparatory to analysis.

The trailer rack herein described was constructed to carry 44 individual samples of 25 fruits each. The fruits are impaled on 12-gauge pointed steel wire pins 4 inches long. The pins bearing the fruit are placed on the sampling boards and are finally transferred to the sample-carrying boards, which are then slid into their proper place in the rack.

The method of collecting fruit on wire pins and mounting them on boards or long sticks is not new; as early as 1932[1] this procedure was used by the Vincennes laboratory of the Division of Fruit Insect Investigations for collecting fruit from field spray plots for artificial infestation under controlled laboratory conditions. At that time the sticks bearing the fruit were placed in slotted drawers of large wooden boxes, which were brought in from the field by truck. From 1936 on, a four-wheeled trailer[2] bearing a specially constructed rack has been in use by the Division of Fruit Insect Investigations for carrying samples for biological testing from the orchard to the laboratory.

It will be seen, therefore, that the trailer rack herein described is merely an adaptation of a previously devised rack, the alterations in design being made in such a fashion as to make

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[1] Lathrop, F. H., and Sazama, R. F. 1932. A laboratory-field method for the study of the efficiency of codling moth sprays. Jour. Econ. Ent. 25: 83-96, illus.

[2] Steiner, L. F. 1939. The laboratory-field method for testing codling moth insecticides. U. S. Dept. Agr., Bur. Ent. and Plant Quar., E-488, 10 pp. (multigraphed), illus. September 1939.

it more suitable to the sampling for chemical analysis It permits the placing of an entire 25-fruit sample on a single board. The boards are of a size that will allow them to accommodate 25 fruits up to $2\frac{1}{2}$ inches in diameter. For larger fruit it will be necessary to space the holes for the wire pins a little differently, and the number of fruits per board will have to be reduced.

The trailer rack was constructed according to the plans given in figures 1 and 2. Figure 3 shows the truck and trailer ready for travel from the orchard to the laboratory. Figure 4 shows the trailer open and ready to receive the samples. In figure 5 a sample-carrying board has been mounted on the side of the rack to illustrate the way in which each stratum sample is placed in it. Directly below it are shown the sampling boards with their respective fruits ready for transfer to a sample-carrying board. In position from left to right it will be seen that 7 fruits are taken from the top stratum of each tree, 10 from the middle stratum, and 8 from the bottom stratum. By this placement it is possible to conduct studies of residue loads on either the entire tree or sections of a tree. Figure 6 shows a view of the rack with some of the boards filled with fruit and in place.

The trailer itself is a small two-wheeled unit consisting of chassis, springs, axle, roller-bearing 16-inch wheels, and trailer hitch.

The bottom frame illustrated in figure 1 was bolted directly to the trailer chassis in several places with 3/8-inch carriage bolts of suitable length. Flat washers and lock washers were used in all cases to prevent the nuts from working loose.

To prevent the sample-carrying boards from jumping out of their grooves during transit, it was necessary to use square-bend screws 2 inches long with $\frac{1}{2}$-inch bends. One screw inserted in each runner about 10 inches from the front of the rack was found to be sufficient to prevent any jumping of the boards. The screws were run down until the projecting bends were about 1/8 inch from the sample-carrying boards.

The sides of the trailer rack are covered during transit with curtains of automobile topping material. These curtains contain a piece of strap iron $\frac{3}{4}$ inch wide and 61 inches long, which is inserted in a hem in the bottom of the curtains to weight them down. The sides of the curtains are folded around the front and the back of the trailer and secured in place with automobile curtain snaps. During the sampling the curtains are rolled up to the top of the rack and held securely by cloth straps.

As a safety measure a combination stop light and tail light was mounted at the left rear of the trailer rack. Two-wire cable with a detachable coupling was used, the two circuits being grounded to the trailer chassis, which in turn grounds to the truck chassis through the hitch.

A list of lumber necessary for the construction of the trailer rack is given below. It should be noted that all dimensions of lumber are full measure, in which case a piece listed as 2 by 4 inches is actually that size and not a standard "2 by 4" which in reality is $1\frac{5}{8}$ by $3\frac{5}{8}$ inches.

Lumber List

2	2" × 4" × 60" Bottom frame
1	2" × 4" × 52" Bottom frame
2	2" × 6" × 42" Bottom frame
10	2" × 2" × 53" Side posts
2	2" × 4" × 53" End posts
3	2" × 2" × 60" Side ties, middle ridge tie
2	1" × 2" × 42" End ties
6	2" × 2" × 56" Cross runner stops
5	1" × 4" × 56" Cross runner rests
24	1" × 4" × 20" Runner supports
20	1" × 10" × 20" Runner supports
10	1" × 8" × 20" Runner supports
4	1" × 6" × 20" Runner supports
88	1" × 1" × 20" Runners
1	42" × $60\frac{1}{2}$" × $\frac{1}{4}$" 3-ply veneer top
1	42" × 60" × $\frac{1}{4}$" 3-ply veneer bottom (notched to fit)
2	42" × 53" × $\frac{1}{4}$" 3-ply veneer ends
44	$1\frac{3}{8}$" × 10" × 20" sample-carrying boards (white pine or other soft wood)
3	$1\frac{3}{8}$" × 7" × 13" sampling boards

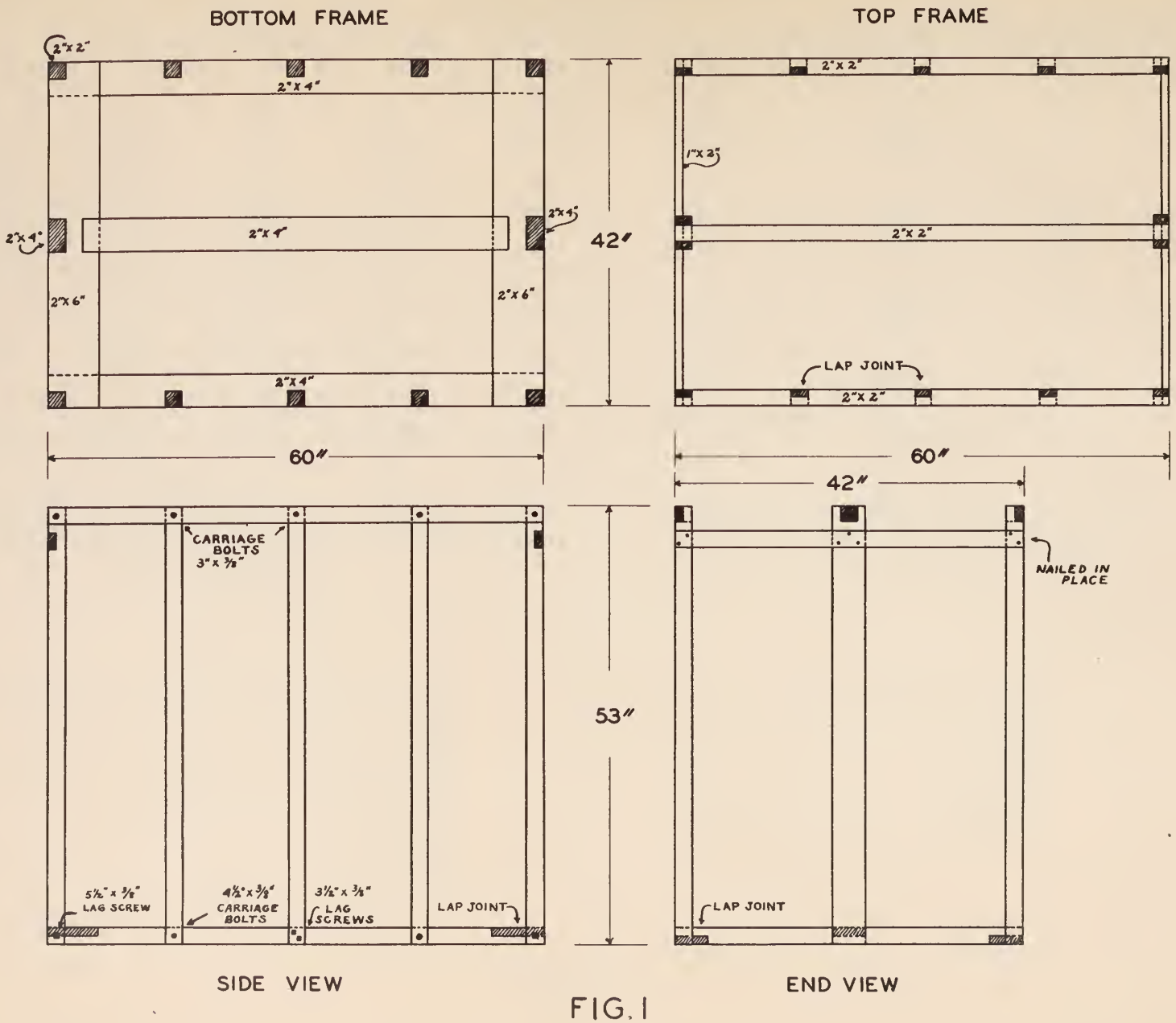
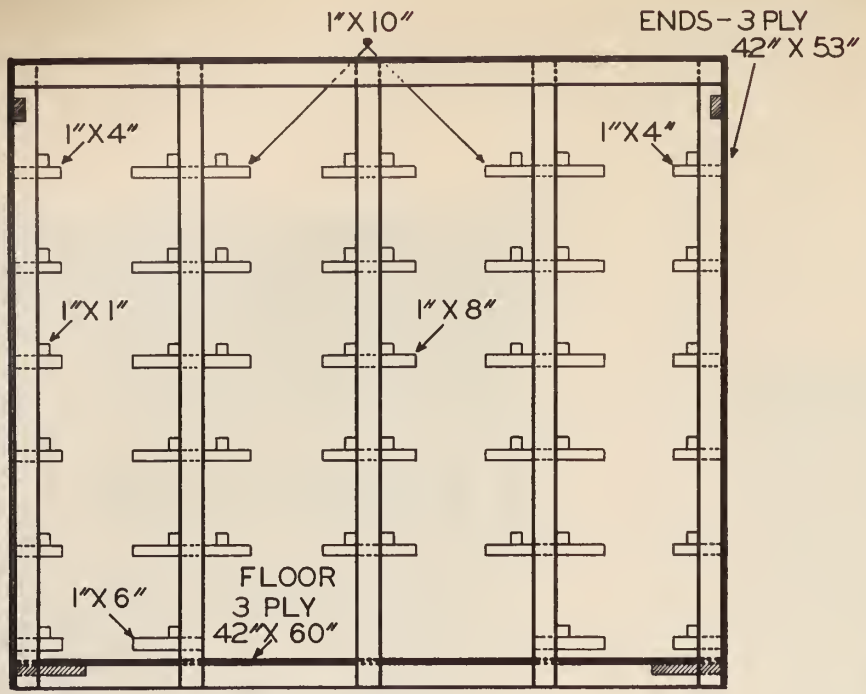
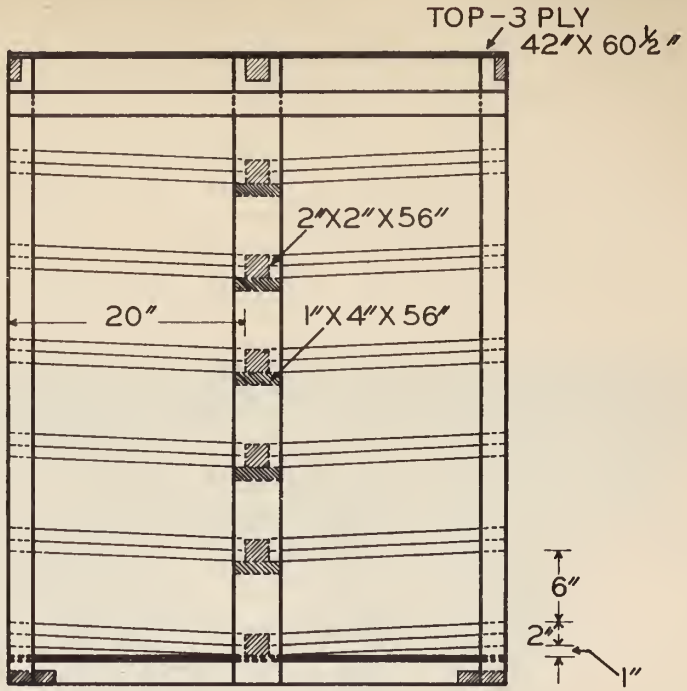

BOTTOM FRAME
TOP FRAME
2"x 2"
2"x 4"
2"x 4"
2"x 4"
2"x 4"
2"x 6"
2"x 6"
42"
1"x 3"
2"x 2"
LAP JOINT
2"x 2"
60"
60"
42"
CARRIAGE BOLTS 3" x 3/8"
NAILED IN PLACE
53"
5½" x 3/8" LAG SCREW
4½" x 3/8" CARRIAGE BOLTS
3½" x 3/8" LAG SCREWS
LAP JOINT
LAP JOINT
SIDE VIEW
END VIEW

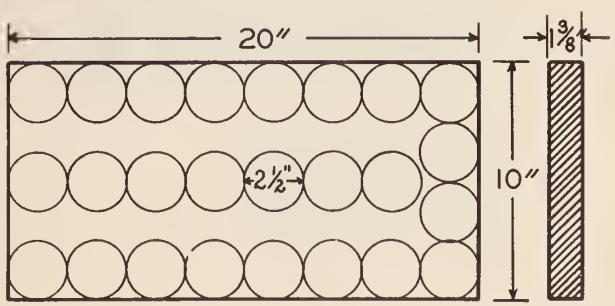
FIG. 1



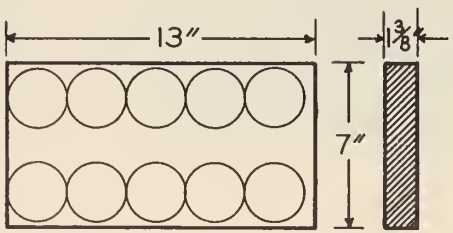
SIDE VIEW



END VIEW



SAMPLE CARRYING BOARD



SAMPLING BOARD

FIG. 2

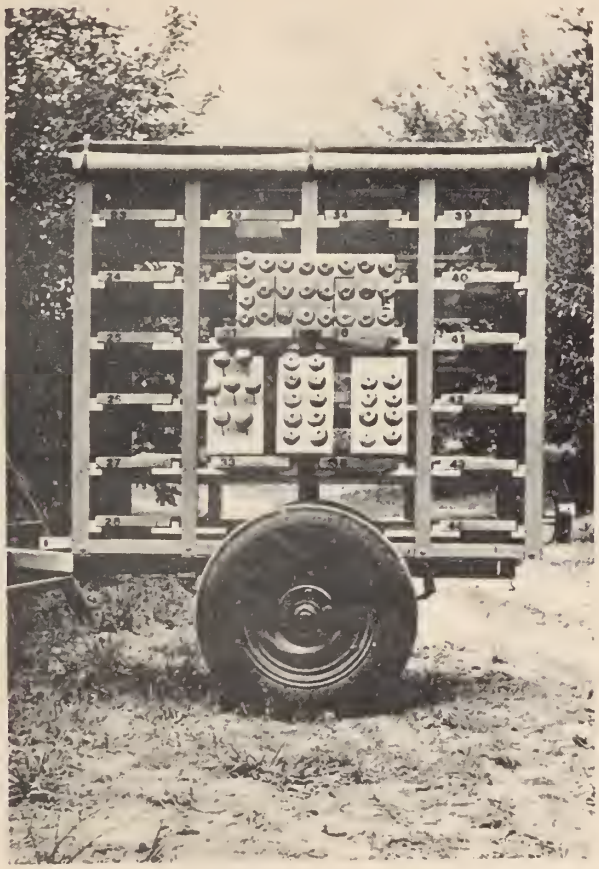


Figure 5.--Method of placement of fruit.

Figure 6.--Rack partially filled with fruit.

Figure 3.--Truck and trailer ready for travel.

Figure 4.--Trailer open to receive samples.

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